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SUMMARY

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THE INDUSTRIALISATION OF BUILDING TECHNIQUES

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SUMMARY

THE INDUSTRIALISATION OF BUILDING TECHNIQUES

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1. The demand for building in the United Kingdom is expected to double during the next 25 years while the labour force increases by only 5%.

2. Mechanisation of conventional building methods is not enough; the required improvement in output can only be achieved by radical changes in design.

3. The most successful systems of prefabricated construction in the U.K. are of the 'light and dry' type which have been designed primarily for school building.

4. The most widely used of these is the CLASP system; size of the CLASP programme is now £10 millions a year. The system consists of 50% of factory-made components: light steel frame, heating system components, pre-cast concrete cladding, window frames, rubber floor finishes, eaves units, roof lights, light gauge steel vitreous enamelled panels, internal doors, prefabricated partitions, sanitary fittings. Buildings are planned on a 3'-4" grid and may be up to 4 storeys high.

5. Several public authorities combine to use the CLASP system; orders are placed centrally. CLASP buildings are cheaper than buildings of conventional construction of equivalent quality; erection times are faster. The CLASP system is also being used in Germany and Italy.

6. Among other systems now being developed, the NENK method of building is being designed in the War Office. This has to cater for many different types of building; higher performances in loading, sound insulation and fire resistance are needed. The NENK method has floors and roofs of light steel space-frame construction and will allow much greater flexibility in planning.

7. The 'light and dry' systems may be regarded as an intermediate stage in the progress towards fully industrialised building techniques. The long term aim is to have factory-made components which are available on the free market and which are interchangeable with one another. Much more work is needed on dry-jointing techniques.

8. In the U.K. about 50% of building is in the public sector. Programmes of building determined from year to year leave too much uncertainty. Where large client authorities have been able to state their future demands for larger periods ahead, rapid technical development has taken place.

9. Development groups have been formed in the Ministries concerned with schools, housing, hospitals and buildings for the Army. Such groups have originated many of the industrialised building techniques now in use.

10. Other valuable aids are (a) modular coordination, (b) cost planning, which allows the cost of each element of a building to be controlled at all stages of design, (c) close cooperation between designers and component manufacturers.

11. From the U.K. experience, certain principles may be identified for application in the less-developed areas.

12. Government action is necessary to establish forward demands for majority types of building for at least 5 years ahead, preferably more. Firm programmes can then be formulated to which technical development can be related.

13. Development groups can be set up in relation to each programme; each group should contain the best available skills in design, cost control and administration. The parent organisation should preferably be a Government department; the development group should be placed high in the organisation. The group should build experimental projects but its work should be kept separate from that of production teams.

14. The development group should assess the available resources, for instance:-

(a) The capacity of the professional staff available to design individual buildings within the programme;

(b) The existing and potential capacities of the manufacturers of building components;

(c) The capabilities of building contracting organisations, the availability of plant and the level of skill of site operatives;

(d) The problems of geographical location and transport.

15. In the light of all the relevant factors, the group should be able to determine which method of building to adopt. There are three principal categories:-

(a) 'Light and dry'. Majority of components made in factories; erection a semi-skilled process; a framed system preferred. Allows great flexibility in design; buildings may be placed anywhere that transport can reach.

(b) 'Heavy and dry'. Large pre-cast concrete components made at a central plant; load bearing panel system preferred. Less flexible in planning; requires heavy lifting devices on site; buildings can only be placed within a limited distance from the main plant.

(c) 'Wet and heavy'. Mechanised site operations using in-situ concrete in highly standardised formwork. Requires substantial equipment on every site and a skilled labour force. Most effective when building design is completely standardised.

16. Traditional building processes may be rationalised and levels of skill improved, but this takes a long time to accomplish. It may be more effective to adopt industrialised building techniques in the first instance.

17. The trend for the future is towards the pooling of skills and the integration of organisations within building industries. It can be a drawback to have a well-established building industry which is fragmented according to traditional trades and crafts; in which the professional and contracting interests are firmly entrenched in numerous separate institutions. In this respect, the balance of advantage may lie with the less developed countries of the world.

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